JOURNAL OF THE SOCIETY OF HEARING AID AUDIOLOGISTS

AUDECIBEL

AUGUST 1958

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SOCIETY OF HEARING AID AUDIOLOGISTS
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MAICO FRANCHISE MORE VALUABLE THAN EVER IN HEARING INDUSTRY

Maico Dealers everywhere are breaking sales records with new 1958

Sales Tested, Slender

MAICO HEARING GLASSES

To reach peak profits with a hearing instrument dealership, two things are needed most—top quality manufacture and a completely rounded, *tested* sales promotion program. Maico Dealers have both! In the hearing aid field, the name Maico is synonymous with quality and leadership. In dealer support, Maico goes all out. Maico Dealers reach peak profits by following the Maico plan. Why not let the *sales tested* Maico Franchise be your key to peak profits! Write Earl G. Peterson, Maico Electronics, Inc. for full information and franchise availabilities.

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THE SEVENTH
ANNUAL MEETING
of the
SOCIETY of HEARING AID AUDIOLOGISTS

★

October 9, 10, 11
LaSalle Hotel
Chicago, Illinois

WATCH FOR PROGRAM ANNOUNCEMENT

It's important

THAT YOU KNOW WHERE TO BUY QUALITY
Earmolds

ANY STYLE • ANY MATERIAL

No matter what your requirements as to earmold style or material we can meet your needs with a quality product. Twenty years of continuous, high-quality production backs our claim.

Have you tried

Formtex Impression Compound

- Mixes rapidly
- Sets slowly
- Not tacky
- No ear distortion
- Absolutely no shrinkage

Use this greatly improved product and be convinced.

Ask for our brochure and further particulars

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Highest Quality Products for 20 Years

The Society of

1958 ANNUAL MEETING
October 9, 10, 11
LaSalle Hotel, Chicago, Illinois

HEARING AID AUDIOLOGISTS

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Isn't it so that any business and profession could hardly get along without the "small minority?"

Who else would they blame when the public becomes outraged at being cheated or discomfitted by shoddy work?

It's only a "small minority" who cheat or do shoddy work—that's the pious statement. "The vast majority of our group are competent and honest," the statement goes.

And this is true, in its way. Everyone is willing to concede that it must be a small minority. If it were the majority, the public would have no faith at all in the group, and society would soon eliminate it.

But these "small minority" statements are evasions by the majority. They always make it sound as if the majority, or all, of the group were being accused of the bad practice.

And it's so comforting for the majority to look at each other and say, "Why, we wouldn't do that." Of course not.

But this hypocritical "small minority" statement allows the group to feel it has done something about the charges made against the shoddy workman and the cheat. And in fact, often it has done nothing.

Responsibility is a heavy thing. No one wants to lift any more of it than he absolutely has to. Instead of the "small minority" statement and a pious look and righteous feeling, the majority of the group have a responsibility to take steps to protect the public from "the small minority."

After all, how large a "small minority" of the hearing aid industry should the public be asked to tolerate before they indict us all for failing to effectively police our industry and rid ourselves of our "small minority?"

More Power For Better Hearing... Mallory Mercury Batteries

Powerful, amazingly small Mallory Mercury Batteries contribute dependable, fade-free performance to miniature hearing aids. These batteries, originally developed and refined by Mallory, are electrically ideal for transistor circuits. Their tiny size helped make possible today's almost invisible instruments . . . and Mallory engineers are constantly working to new goals of miniaturization and dependability.

MALLORY BATTERY COMPANY
CLEVELAND, OHIO
A DIVISION OF

IN CANADA;
Mallory Battery Company
of Canada Limited,
Toronto 4, Ontario

MR. HEARWELL'S *Notebook*

Dinner was over and the heat of the afternoon sun was fading into a coolness in the Hearwell home.

Mr. Hearwell, having eaten a satisfying but somewhat mystifying meal of something his wife called lasagna, her newest recipe, and having eliminated the chore of watering the grass, was relaxed in his easy chair reading the newspaper as the clock crawled toward 10 p.m.

There wasn't too much in the news. "Ah another mixed up day with those wonderfully unorganized French," thought Mr. Hearwell, after reading the latest communiques from abroad —and then an ad caught his eye.

Encountering New Earmold Problems With Hearing Aid Glasses? ? ? ?

MANY DEALERS ARE - -

AND ARE FINDING

A SOLUTION WITH Mid-States

SOFTEX and NUTEX EARMOLD

SOFTEX and NUTEX EARMOLDS have swept the nation used conventionally — Now applied to hearing aid glasses, SOFTEX and NUTEX EARMOLDS are proving THE ANSWER to close acoustical seal with comfort to the user.

SOFTEX and NUTEX were developed *by* hearing aid people *for* hearing aid people.

CHARTER MEMBERS:
Hearing Aid Industry Conference, Inc.

MID-STATES *Laboratories*
630 N. Francis
Wichita, Kansas

"The QUALITY Earmold Facility"

It was the advertisement of one of his competitors.

The ad boasted of an invisible hearing aid operated (no indication of how long it operated this way) by atomic power. Mr. Hearwell laid the paper on his lap.

Mr. Hearwell's mind was a long way off. It went back to 1936 and the first advertisements of a bone conduction hearing aid—that was as it turned out, the first real gimmick. Gimmick. That was the word the advertising men used to describe an angle, or what salesmen would call "a hook on which to hang your sales argument."

It had been a long time. Back in that era it was remarkable if you could restore even a part of a person's hearing, to say nothing of making concessions to his vanity.

It had been a long time. But the gimmick was still there. Here was this ad, playing on the same old emotional theme — singing the song that: "No one would ever be able to guess by looking that you were hard of hearing." Well, compared to 1936 that was 100% true. But it wasn't true, really.

This was a slight falsehood, reflected Mr. Hearwell. Oh, yes, the atomic hearing aid was certainly a remarkable buy. It was one that would hardly be detected as a hearing aid by the undiscerning. It worked well, compared to hearing aids of the remote past. But the ad wasn't, just wasn't telling the entire truth.

And that set him to thinking.

Was it ethical to advertise in such a way that the potential client might expect a miracle—a miracle that wouldn't be forthcoming?

Was, or is it, justifiable to use gimmicks in advertising?

A lot of dealers used gimmicks, he knew. He, himself, had not. But, was he just being bluenosed about it?

Mr. Hearwell thought about the problems. He thought of the great number of people in this country who need hearing aids, but who sit in their homes, isolated from friends, cut off from television, and upset with their wives or husbands and associates, the great mass of people who need hearing aids to put them in contact again with the world.

He tried to make the problem as objective as he could. So, not being in the optometry profession, he thought about eyeglasses. For him, this was a neutral subject, but one in many ways akin to hearing aids.

If he were an eye specialist, he thought, and he had a patient who had just been measured for optical lenses that required a special, bulky frame, what would he do?

There was no question of what he would do, he knew. He would tell the patient, "You have a choice of only those frames in order to be properly fitted with your glasses." And if the patient said:

"I wouldn't be seen dead in these, doctor. What would people think? These frames over here suit me better."

Mr. H e a r w e l l considered. Would he as an eye specialist allow this person to leave without any glasses, when to continue without glasses would mean further damage to eyesight? Or would he compromise?

Would he bend, fairly state the risk with vanity-satisfying frames, but go along with the patient, rather than allow him to leave without any correction at all.

Mr. Hearwell concluded that it would be better to make an immediate compromise in order to achieve a long-term goal of

(Continued on page 14)

reasons TONEMASTER sales *are at an all time HIGH!*

Nationally Advertised
TV—Each week Tonemaster is featured on national network TV. Free hearing aids are given away to worthy recipients all over the U.S.
Magazines—Leading national magazines are used consistently and productively through the year keeping Tonemaster before millions of readers.
Newspapers—High volume dealer sales result from the consistent, hard-hitting campaign carried out monthly at the national and local level.

The most magnificent line of quality hearing aids ever developed — Tonemaster ahead-of-the-field instruments . . . recognizable immediately. Scientifically engineered to give the finest performance and most dependable operation of any hearing aid on the market.

Advertising mats, counter cards, descriptive literature, colorful folders, effective mailers, prestige letterheads and merchandising helps are all available to Tonemaster dealers. Factory-paid advertising, both national and in key dealer markets, provides a steady flow of new, high-quality leads.

Several selected territories available for Tonemaster dealerships — here is your golden opportunity to get in on the assured profits from Tonemaster . . . the hearing aid company that revolutionized an industry in four years. We need good dealers — just as you need an outstanding product to sell. Write us today. Let's put our combination together for increased profits.

Your inquiry is cordially invited. All communications will be held in strict confidence.

TONEMASTER

MANUFACTURING COMPANY

128 SOUTH MONROE • PEORIA, ILL. • PHONE 6-0871

PART II — Conclusion . . .

HEARING AIDS and HEA

By Dr. John

The amplitude proportionality of an instrument may be tested by applying to it a sound impulse in increasing steps of 10 db and by observing whether the output increases by 10 db for each step. A graph of amplitude proportionality for a perfect aid is shown by the graph in Figure (2) marked "Ideal." The graph marked "Good" shows how closely the ideal may be approached by careful design and engineering in a commercial product.

The graph marked "Unstable" shows an aid whose output increases too much in proportion to input, thus indicating a tendency to oscillate or towards instability. The graph marked "Low Output" shows an aid having poor amplitude proportionality because it falls off at the higher levels. Consequently this aid has high distortion, as well as insufficient output, because it saturates at 120 decibels. The graph marked "High Distortion" shows an aid which eventually may produce 135 decibels, but distortion is such that the instrument becomes unsatisfactory to use at 120 even less than decibels.

A hearing aid is a device which is basically intended to increase the effect of a sonic wave on the tympanum, or ear drum. Regardless of how or why an individual may be deaf, the intention of aiding is to make the tympanum behave as though the sound were louder than it actually is.

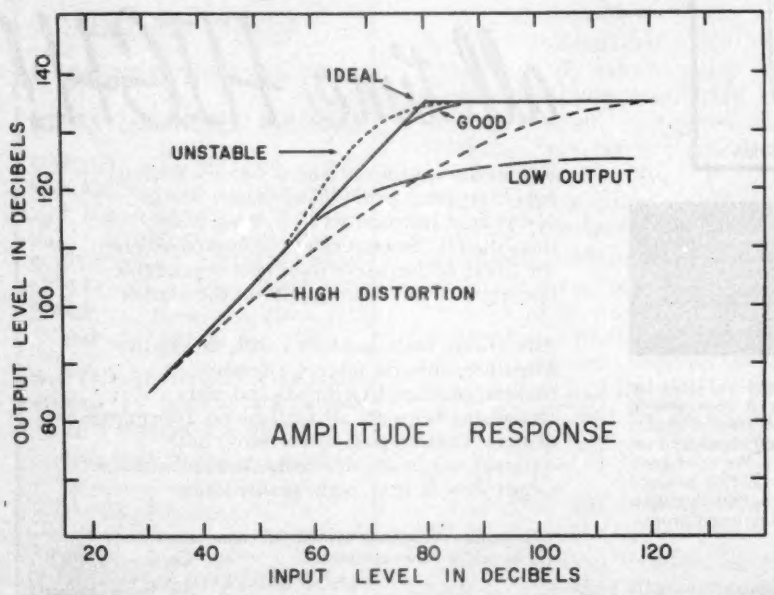

FIGURE 2. Input versus output, or amplitude response, graphs showing various types of effects ordinarily encountered in commercial hearing instruments. The graph marked "Good" represents measured values for one commercially available instrument.

Commonly it is said that this is done by amplifying the sound. Scientifically, a clearer picture is obtained if it is said that the sonic pressure at the eardrum is to be increased. One then instantly becomes aware that, at the higher pressures, leakage can be a problem and that conducting a sonic wave through an ear mold may not be as easy as first expected. If there is the slightest leak, however unimportant it may seem, the pressure delivered to the tympanum will be altered and the finest and most expensive engineering that produced the aid itself will be without meaning. The audiologist must make certain that the earphone fits without leakage into the ear mold and that the ear mold fits tightly into the ear canal without leakage. Otherwise technical comparisons are impossible. Obviously, one cannot even guess at the pressure reaching the tympanum or the effective frequency response if there is a leak in the system.

There must be an upper limit to the sonic pressure which may safely be applied to the tympanum. Various values have

EARING

John A. Victoreen

been given, from 130 to 140 decibels, depending upon the meaning of the work "safe" and also upon the method used to determine the actual existing pressure. It may be argued that with conductive hearing loss, much of the vibration of the eardrum is not transmitted to the inner ear, and thus a greater than normal vibration amplitude, or pressure, may be applied to the eardrum without danger. This may be so, but with no information except that of a threshold audiogram and an indefinite condition described as conductive loss, only an audiologist with uncommon fortitude could feel certain.

Until suitable information and techniques are available to the contrary, let us then assume that the safe upper limit of peak pressure measured properly at the tympanum is 135 decibels. The great difficulty is not in deciding upon the value of 135 decibels, for qualified authorities such as the Bureau of Standards will eventually do that, but in being certain that a given manufacturer's rating of 135 decibels means what it is assumed to mean, so that comparisons can be made. Reputable manufacturers desire, and profit by, an unambiguous standard rating system; audiologists gain when they understand and use such ratings.

Inasmuch as a limiting factor of every hearing aid is the instantaneous peak sound output it can deliver, this must be one of the dominant factors used to describe any given hearing aid. This factor cannot be stated simply or accurately unless certain other factors are also known.

Maximum peak output exists when an increase in input ceases to increase the output and clipping of the peak occurs. In an aid which functions well, this occurs abruptly as the input is increased, as shown in the "Ideal" graph of Figure (2). In a poorly functioning aid, there is no definite point at which this saturation occurs, indicating severe amplitude distortion, as shown in the "High Distortion" graph of Figure (2). Such an instrument may have a 135 decibel upper limit of output, but its distortion may be so severe at less than 120 decibels that it is unsatisfactory. In other words, it might be safe but unusable. Therefore, any statement of maximum output of an instrument must, to have meaning, also refer to the degree of distortion at that output or at least assume it to be satisfactory.

Dr. Victoreen

Distortion is relatively easy to measure. There appears to be no reason why a hearing aid audiologist should not demand a graph from the manufacturer which shows the percent of distortion existing at various output levels for the particular product he dispenses. Under these circumstances, an aid rated at 135 db maximum output, but with 50% distortion at 120 db, would not be confused with the product which has 135 db maximum output with only 5% distortion at 130 db.

How much power should an aid have? The power output is unimportant. What counts is the sound pressure which is delivered to the eardrum. Ordinarily the sound pressure output would be expected to be greater with instruments of greater electrical power, but this is not always so. Regardless of any other factors, an instrument should always be capable of delivering as high a sound level to the eardrum as the particular individual can tolerate, but not greater than about 134 db, which is assumed to be the normal safe upper limit.

Assume for a moment that a man with normal hearing asks you to fit him with an aid that lets him hear as much as he can hear without it. It is obvious that he would need an aid which could, when required, deliver all the pressure that the ear can safely take, since many natural sounds approach this level. If that same man became deafened, the maximum required pressure producing capacity of the aid would certainly not be reduced (except, of course, in certain cases where loud sounds cannot be tolerated.)

Decreasing the output of the aid would only mean that its peak limit would be reached more often and that more sounds would be clipped. Peak clipping is generally undesirable, because it reduces intelligibility.

It follows, then, that for general safety a maximum peak output of 135 db is the upper limit for a hearing aid, and that, for the closest approximation to normal hearing, a good aid should be capable of delivering up to 135 db without severe distortion. It also follows that any reduction of power handling capacity below that required to produce a pressure of 135 db would require concrete and specific justification to be considered good practice.

(Continued on page 13)

Planning Continues for . . .

S.H.A.A. ANNUAL MEETING

OCTOBER 10, 11 - CHICAGO

Program Highlights:

CONVENTION THEME

"He is most successful who adapts from the greatest number of sources."

- "The Do It Yourself of Selling"
- Future of Hearing Aids
- Teacher's Viewpoint on Hearing Aids
- Otologist's Role
- Report on H.A.I.C. Conference

A complete program of the 7th annual meeting of the Society of Hearing Aid Audiologists, to be held at the LaSalle Hotel in Chicago, October 10-11, will appear in the next issue of Audecibel.

The issue will be in your hands just in advance of the meeting.

Meanwhile, here are more highlights of the program:

A dynamic speaker will discuss "The Do It Yourself of Selling" at the Saturday luncheon session. He is Harry Manzer, general agent of the Washington National Insurance Company.

The future of hearing aids and new power sources will be discussed by two technical experts. William Greenbaum, vice president of Otarion Listener Corporation, will talk on "The Technical Developments in Hearing Aids of the Future."

"Solar Systems and Future Batteries," may be discussed by Gordon Ives, of P. R. Mallory, Inc., who has been invited but has not yet confirmed that he will be available for the dates of the meeting.

The enormous and often-neglected field of deaf children will be discussed by a woman who has spent 30 years teaching the deaf child. She is Miss C. Rebecca Brown, principal of the Grand Rapids (Mich.) public School for the Deaf.

Her talk "Hearing Aids and Deaf Children: A Teacher's Viewpoint" will especialy emphasise problems with the child under five years old.

Miss Brown, a graduate of Drake University and Central Institute for the Deaf, is a board member of the Grand Rapids Hearing and Speech Center and a member of numerous other speech and hearing organizations.

"The Individual Otologist's Role in Hearing Aid Recommendations" will be discussed by Dr. David Myers, professor of Otolaryngology at Temple University Medical School and chief of Otolaryngology at Temple Hospital.

Another speaker will be David Barnow, who will bring the Society a report on the Hearing Aid Industry Conference.

The ethics and rules of the SHAA will be discussed by Thornton Zanolli, of Detroit, immediate past president of the SHAA.

Plans are incomplete at this time, but will be announced in the October issue of AUDECIBEL, for the debate on the subject of licensing hearing aid dealers. This debate, arranged to clarify all the viewpoints on the subject of licensing, promises to be an outstanding feature of this year's program.

A discussion of the need for the Society to foster the standardization of tests for the fitting of hearing aids, and the equipment for hearing aid audiologist's office is also in preparation.

A discussion by an outstanding psychologist of the need for recognition of the special problems of the hard of hearing which help us to help them will also be confirmed in the October AUDECIBEL.

It is planned also to present an expert on the subject of ear molds to discuss the various problems which arise in their selection and use with hearing aids.

Other features are planned and will be definitely announced in the next issue. Meantime, members will receive reservation cards from the LaSalle Hotel and are asked to co-operate with the Program Committee in making their reservations as early as possible.

Here are six excellent reasons why

YOU CAN'T AFFORD

to miss the annual convention of THE SOCIETY OF HEARING AID AUDIOLOGISTS

1. *It's your meeting.*
2. *Nationally recognized authorities will discuss your business.*
3. *Industry leaders will discuss operational practices, personnel policies, public relations techniques and advertising procedures applicable to your business.*
4. *A noted economist will analyze the business picture, indicating how the future looks for your business.*
5. *After-hours "bull sessions" will provide an opportunity to get a solution to your particular problem as well as furnish periods of good fellowship.*
6. *Coming to Chicago will enable you and your family to combine a vacation trip with business.*

AUDECIBEL

S. H. A. A.

ANNUAL MEETING ISSUE

OCTOBER 1958

Deadline Sept. 10th

The biggest and best Annual Meeting of the Society of Hearing Aid Audiologists is coming up October 9, 10, 11. Official publication of this meet will be AUDECIBEL Magazine. If you sell to, or wish to influence the hearing aid industry in any way—space advertising is this Annual Meeting issue is a must for you.

Regular advertising rates apply. Deadline is already close. Best locations always sell first. Make your space reservation today—copy can come later.

Phone DUnkirk 6-2500 (Detroit) Collect to make space reservations in this important issue

Gathered HERE & THERE

Hearing Aid Helps Check Breathing

A new field has been opened for the hearing aid—as a delicate assistant to the anesthesiologist, checking breathing of patients during surgery, Atlantic Monthly reports.

A hearing aid is taken apart. The microphone is put in a cork which is placed in the anesthesia breathing tube.

The earphone is worn by the doctor giving the anesthetic.

Even the slightest shade of breath brings a sound to his ear.

This has two advantages over the old method of keeping track of breathing of a patient during an operation. The rise and fall of a breathing bag tended to hypnotize the anesthesiologist.

If there was an obstruction to breathing, there was no way to tell with the breathing bag. But the hearing aid does give clues.

The new method, worked out by a doctor and dentist at Baltimore's Lutheran Hospital, is especially valuable in head and neck surgery.

* * *

Dog Fitted With Molded Earpiece

An elderly Chow dog in Miami, Florida, was recently fitted with an air conduction hearing aid with an individually molded plastic earpiece — but not without difficulty, according to the National Humane Review.

The dog (it's name is Brownie) may be the first in the country to wear an individually molded earpiece. Other dogs have been fitted with bone-conduction type aids.

Brownie's master, John Druiett, noticed the dog failing to respond when he called her. He took the problem to just the right man, Dr. Edward A. Majilton, a veterinarian who wears a hearing aid himself.

Dr. Majilton, unable to find any precedent in literature available to him, went to a local hearing aid manufacturer's representative.

A plastic impression was made of Brownie's ear canal without trouble.

But Brownie would have no part of it when Dr. Majilton and the hearing aid representative tried to fit her with the finished earpiece, complete with its tiny receiver button and small wire to the amplifier.

She shook her head until the tiny plastic piece fell out. They refitted it. She pawed and shook it out again.

Then the veterinarian separated the earpiece from the receiver and fixed it and the amplifier to Brownie's collar with a plastic tube running to Brownie's earpiece. He taped it that way.

Brownie didn't seem to mind. The hearing aid was turned on. Her master called her from another room. The old dog's tail wagged. She stood up slowly and walked in to stand at his side.

* * *

Optometrists View Calif. Group Display

Fifteen types of hearing aid glasses were displayed by the Certified Hearing Institute of California at a June convention in Los Angeles Hotel Statler. Members of the Institute were invited guests at the national convention of the American Optometric Association in arranging the educational exhibit.

Dr. Walter O. Studt, chairman of the AOA convention committee was lavish in his praise of the display and the lack of commercialism by the members of the institute who staffed the exhibit. The glasses were displayed and demonstrated in such a manner that the optometrists were able to get an unprejudiced understanding of the fitting of the various instruments.

The Certified Hearing Institute of California is a non-profit organization established for the purpose of making available unbiased information to all interested in hearing problems. First president of the group is Mrs. Elizabeth K. Horning. The rest of the executive board consists of Esther R. Daniel, James K. Delk, and Gus Kruell. Miss Daniel, Mr. Delk, and Mr. Kruell are all members of the Society of Hearing Aid Audiologists. Headquarters of the organization have been established in the Southwest Medical Center, at 318 E. Hillcrest Blvd., Inglewood 1, California.

CORRECTION

The correct name of the author of *Audiology, Principles and Practice*, which was reviewed on page 20 of the June issue of AUDECIBEL, is Dr. Hayes A. Newby.

Dr. Newby is Associate Director of the Speech and Hearing Clinic at Stanford University. His excellent textbook is published by Appleton, Century, Crofts, Inc., and may be obtained on order through your local bookstore.

News About SHAA

Mr. W. H. Otten, a governor of the Society of Hearing Aid Audiologists recently suffered a heart attack while visiting in Burlington, Iowa. He is recovering in the Burlington Hospital. In business life, Mr. Otten is president of Maico Otten and Associates in Omaha, Nebraska.

New Applications Certified:

Mrs. Prisca O'Byon Bonsteel, 307 W. Broadway, Louisville, Ky.

Norman Henry Cammick, The T. Eaton Co., Toronto, Ont., Can.

Miss Nadyne E. Gulnac, 218 W. Garfield, New Castle, Pa.

Leonard J. Hartman, 100 F. Bldg., Eugene, Ore.

John Charles Kenwood, 229 W. Berry St., Fort Wayne, Ind.

Orval J. Klinger, 2489 Fort St., Wyandotte, Mich.

Arnold Edmond Monk, T. Eaton Co., Ltd., Winnipeg, Manitoba, Can.

Thelma Sprague, 249 Alvardo, Monterey, Calif.

LeRoy D. Waldron, 197 W. Market, Warren, O.

New Firm Certified:

Maico Kenwood Hearing Service, 229 W. Berry St., Fort Wayne, Ind.

Applications Pending:

Robert H. Ackerman, South Bend, Ind.
William E. Bradford, New Orleans, La.
Allan H. Brownfield, Orlondo, Fla.
Charles N. Conte, Providence, R.I.
Herbert T. Davis, Burlington, Vt.
Egon T. Fleck, Victoria, B.C., Canada.
George W. Herrick, Lansing, Mich.
John F. Heskett, Grand Junction, Colo.
Elizabeth Horning, Inglewood, Calif.
Lawrence C. Ingles, Toronto, Ont., Canada.
Herbert Ivie, Springfield, Ill.
William A. Jewell, Ossinging, N. Y.
Jacob Harvey Kisling, Denver, Colo.
John L. Lyons, Peoria, Ill.
Mr. J. M. Murdock, St. Petersburg, Fla.
Mrs. Josephine W. Murdock, St. Petersburg, Fla.
Frank N. Pascal, Youngstown, Ohio.
Patrick G. Riordan, Cleveland, Ohio.
Clarence J. Rober, Pittsburgh, Pa.
Lloyd A. Smith, Sioux Falls, S.D.
Loren H. Stevenson, Tampa, Fla.
Phillip J. Toconita, St. Paul, Minn.
Robert K. Turner, Montreal, P.Q., Canada.
Sydney Usdan, Memphis, Tenn.

Firms Pending:

Beltone Pittsburgh Co., Pittsburgh, Pa.
Community Hearing Center, Pawtucket, R. I.
National Hearing Associates, Providence, R. I.
Newport Hearing & Speech Center, Newport, R. I.

HEARING AIDS and HEARING

(Continued from page 9)

There has been some perfectly natural confusion between the terms *maximum peak pressure output* and *acoustic gain* (or *amplification.*) Maximum peak pressure output limits the maximum gain which can be used successfully with the instrument. Ordinary conversation at a distance of one meter contains many peaks reaching a sound level of 65 db; therefore it is obvious that an aid having a maximum peak output of 135 db cannot have a gain of more than 70 db. Otherwise, over loading and peak clipping occur at ordinary conversation level, because the 65 db input added to the 70 db gain of the instrument totals 135 db, which is the top limit of output. Increasing the gain only 6 db, to 76 db, creates a 100% overload; decreasing the gain by 6 db, to 64 db, provides a 100% safety factor against overloading.

In actual practice the individual adjusts the gain or amplification to the most comfortable pressure level. There should always be some latitude of adjustments so that the gain control is not normally used at full maximum. For example, this would permit a man listening in church to use the extra reserve gain to advantage, provided the background noises were not too great. Thus an instrument rated at 70 db maximum gain, used by an individual having a 64 db loss, will supposedly be used at a 64 db gain control setting. It will then have a 100% safety factor against overloading on normal conversation level at a distance of one meter. Individuals having less loss will set the gain control for less than 64 db gain in order to produce the needed pressure in the ear canal. This requires less peak output from the aid and reduces further the possibility of overload.

The safety limit of a 135 db peak output creates a problem for individuals having hearing losses of 70 db or more. It is obviously impossible to provide more than 70 db of gain without danger of severely overloading the ear mechanism at normal conversational levels. It is technically possible to build an instrument with as much as 100 db gain. However, this, when added to the 65 db of the conversational level, would produce 165 db output. This is preposterous, for it is much louder than a clap of thunder or the sound of a jet plane exhaust.

The foregoing shows that from the physical viewpoint it is theoretically possible to make a hearing aid which is an excellent prosthetic device, provided that the gain is limited to about 70 db or less, and that the peak pressure output is limited to the maximum pressure that the ear can take, neither more or less.

It also shows that in cases where 70 db is apparently not enough, the theoretical value of the instrument to the individual decreases rapidly as the gain is increased, because of the reduced range of sound level which the aid is permitted to handle within the safety limit.

Within reasonable limits, the desirable acoustic properties of an aid would appear to be independent of the type of hearing loss. This must be true because, if an instrument can be shown to be acoustically correct, any changes made for whatever reason would have to leave the instrument less acoustically correct. This consideration is not sufficiently understood because relatively few aids available today approach reasonable acoustic perfection in all properties simultaneously. In effect, many of the changes that are sometimes made to "fit a particular type of loss" are simply a matter of trading one defect for another defect which may appear to be less objectionable in the particular case. The writer submits that it is preferable to build the aid with less

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HEARING AIDS & HEARING

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serious defects in the first place.

Natural physical limits control the range of sound intensities a hearing aid can handle. As hearing loss increases, more gain or amplification is required. As the gain is increased, the range of sound intensities over which an aid can effectively perform is reduced.

It has been shown that an upper limit of 135 db is imposed at a limit to the maximum safe pressure which may be applied at the eardrum. There is also a lower limit imposed by minimum attainable background noise. Even a relatively quiet room has an almost continuous sound level of about 35 db, and useful sounds of 35 db level will merge equally with these and be masked.

The difference between a safe maximum of 135 db and the minimum of 35 db is 100 db. This is the latitude or range of intensities available to the normal unaided ear. An instrument with a gain of 100 db would raise the minimum sound at 35 db to the maximum output of 135 db. To stay within the safe limit of 135 db, the instrument would be saturated at this level; thus the range of useful rounds, or latitudes, is zero. It can be seen that the actual latitude for any given aid may therefore be determined by subtracting the actual gain in db from the normal latitude of 100 db. For example, a gain of 70 db subtracted from 100 db permits a latitude, or useful range, of 30 db under ideal conditions. Less gain provides wider latitude; more gain provides less latitude.

If the background is not 35 db but 45 db — in other words, if the background environment is unusually noisy — the extra 10 db must be subtracted from the useful range. Also, if the aid can only deliver 125 db, instead of 135 db maximum peak output, then the 10 db failure must be subtracted from the useful range of operation. Thus, under the conditions of a 45 db noise environment and maximum peak output from a hearing aid of 125 db, a gain of 70 db will leave a latitude of only 10 db, or a useful range of actual sound level differences of approximately 3 to 1 which is insufficient.

When only a narrow range of sound is available to an individual, the gain control becomes critical in adjustment, for the individual must then tune in each sound level for best intelligibility.

An experienced audiologist knows that more hard-of-hearing individuals are helped by hearing aids than would be expected under the foregoing analysis. The reason for this is the individual's adaptability The analysis is based on physical and acoustical fact with the assumption that the individual will not be satisfied with an aid which is not performing properly. Actually, many individuals have such wide tolerance because of poor discrimination that they have learned to ignore defects which others would not tolerate. Thus the practical limits of operation of a hearing aid are somewhat greater than the theory would indicate.

An individual may not be able to recognize at once the difference between an instrument which is good and one which is not; this is not sufficient justification to permit him to lose the intelligibility which he could eventually learn to obtain with a better instrument.

The writer submits that the conscientious hearing aid audiologist has accomplished much, in spite of the absence of genuinely scientific information and standards to help him, and that he will welcome and, in time, demand accurate, pertinent information about, and a higher standard of performance in, the instruments he dispenses.

MR. HEARWELL'S Notebook

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trying to get the patient to sacrifice a little vanity for a lot of eyesight.

That also, he decided, was the answer to his problem as a certified hearing aid audiologist.

Ads, he thought, that appeal to the emotions are all right. An emotional appeal is necessary because the greatest obstacle to restoration of sound hearing is emotional, the withdrawal of the patient from the world, his fear that people will stare if he wears a hearing aid.

But. And it was a big "but." An ad should not lie. Perhaps there isn't space to tell all of the truth. Also, people allow in an ad for the advertiser's not telling the bad points—only the good ones.

But once a person has answered that ad, he, Mr. Hearwell had an obligation to treat the hard of hearing person fairly, not just pop on him a hearing aid he liked; then hope everything would work out.

The obligation, he thought, included stating fairly which type of hearing aid would do the most good—even if it didn't appeal to the client's vanity.

But the obligation, on the other hand, included compromising with the patient's vanity.

"You can't force on a person a solution that is not psychologically acceptable," Mr. Hearwell thought.

It was better perhaps to be like the eye specialist in the example Mr. Hearwell made up for himself, Mr. Hearwell thought. Bend away from the best physical solution for the patient, but settle for the nearest to it that would be possible. There would be another day to win the whole battle. And in the meantime the benefits of the hearing aid the person was wearing would bring him finally to accept Mr. Hearwell's recommendation.

Now you can say,

"Listen and relax"

There's thrilling clearness– rich, natural sound– and easy listening with a

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Vicon researchers have long known that sound in free air is one thing, but that sound at the tympanum is entirely different. They have concentrated on developing a hearing instrument that delivers sounds at the eardrum virtually identical with those which exist *at the eardrum* in normal hearing, with sufficient amplification to overcome hearing losses.

But not just any amplification would do; it had to be virtually free of distortion or "mushiness"; it had to encompass a wide range of tones; it had to amplify each tone in proportion to its natural loudness, without peaks and bursts of sound.

Today's Vicon Hearing Instruments are the result. They have set new standards of performance never before thought possible in an electronic hearing instrument. They are doing a good job for problem cases and producing results even for some "impossible" cases. ***And they are bringing effortless, enjoyable hearing back to people with moderate hearing losses!***

Dealerships for Vicon instruments are available to qualified, ethical dealers in many cities. You are invited to write on your letterhead for complete information on the advantages of fitting and selling Vicon Hearing Instruments.

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